APPENDIX A

PHOSPHORUS LIMITS FOR INFLOWS INTO EVERGLADES NATIONAL PARK

Attachment I describes interim and long term total phosphorus limits for the combined inflow to Shark River Slough. These limits shall apply to the annual Water Year (October 1 - September 30) flow-weighted-mean concentration of inflows to Shark River Slough, composited across all structures, including S-12A, S-12B, S-12C, S-12D, S-333, and any subsequent inflow points from the WCAs established in the future. Attachment II describes long term discharge limits which will apply to the combined inflow to the Taylor Slough (S-332 and S-175) and Coastal (S-18C) basins. In each basin, long term discharge limits are the limits necessary to meet the OFW water quality criteria as measured at the structures discharging into the Park. These limits will also apply to areas immediately downstream in the Park and will be used to determine compliance. The adequacy of these OFW criteria to meet the State water quality standard Class III criteria (to prevent an imbalance of flora and fauna) will be verified by long term monitoring and research.

If research to determine the numeric value for the Class III narrative nutrient criteria results in a more stringent Park phosphorus limit, then the more stringent inflow limit shall apply.

Effective dates for the phosphorus inflow limits are as follows:

Water Body	Effective Dates
Shark River Slough-Interim Limits	~~July 1, 1997~~ October 1 2003
Shark River Slough-Long-Term Limits	~~July 1, 2002~~ December 31 2006
Taylor Slough and Coastal Basins -Long-Term Limits	~~July 1, 2002~~ December 31 2006

Phosphorus limits apply to flow-weighted-mean concentrations computed on an annual Water Year basis, with data reported and calculated on a monthly basis. To account for hydrologic variations in Shark River Slough, the limits vary with the previous 12-month's total flow in each basin. The long term limit for Taylor Slough and the Coastal Basin is fixed and does not vary with flow. The limits represent the 10% rejection level of the observed flow-weighted-mean concentration at a given total annual flow, adjusted to a baseline time period of March 1, 1978 to March 1, 1979 for Shark River Slough (OFW baseline). The baseline time period for the Taylor Slough and Coastal Basins is Water Year 1984. Compliance with these limits is expected to provide a long term average flow-weighted mean inflow concentration of approximately 8 ppb for the Shark River Slough Basin and 6 ppb for the Taylor Slough and Coastal Basins. Approximate values are as follows:

	Dry Year (117 Kac-ft/yr)	Wet Year (1061 Kac-ft/yr)
Shark River Slough - Interim Limits		
Flow-Weighted Mean	< 14 ppb	< 9 ppb
Shark River Slough - Long Term Limits		
Flow-Weighted Mean	< 13 ppb	< 8 ppb

Taylor Slough & Coastal Basins - Long Term Limit is 11 ppb.

Frequency of samples exceeding 10 ppb within a given 12-month period have also been developed to aid in tracking compliance. Approximate values are as follows:

	Dry Year	Wet Year
Shark River Slough - Frequency Exceedance Frequency > 10 ppb	< 70 %	< 40 %

Taylor Slough & Coastal Basins - Frequency Exceedance must be <53%.

Precise values for the Shark River Slough flow-weighted-mean concentration limits and the frequency at which 10 ppb can be exceeded can be calculated for a given annual flow using the equations given in Attachment I.

A panel of scientists designated by the TOC will track and evaluate compliance with all aspects of state water quality standards including the phosphorus limits, concentration levels and criteria. The represented agencies may request technical assistance from others.

After each additional sampling round at intervals of every other week, the flow-weighted mean will be calculated based upon data from the previous 12 months and compared with the limits corresponding to the previous 12-month's total flow. If the flow-weighted-mean limit is exceeded, the panel will be convened to review recent monitoring data and assess potential causes. Any agency represented on the TOC may request an official review of the monthly mean and frequency calculations for potential violations of the phosphorus limits during the water year.

An exceedance occurs if the flow-weighted-mean concentration for the water year ending September 30th is greater than the 10% rejection level of the computed limit (see Attachments). Based

upon review of trends for flow-weighted means, trends for the frequencies of samples exceeding 10 ppb, and other information found relevant by the panel, the TOC members will forward their opinions and recommendations to their respective agencies for appropriate action. An exceedance will constitute a violation unless the TOC determines there is substantial evidence that it is due to error or extraordinary natural phenomena. A violation of a long term limit shall constitute a violation of this Agreement and of the OFW water quality standard for Park areas immediately downstream of the inflow structures.

Attachment I - Discharge Limits and OFW Standards for Shark River Slough

Interim Discharge Limit:

$C = 11.16 - .00465Q + 1.397[\ 6.377 - .00591Q + .00000436Q^2]$

Long-Term Discharge Limit & OFW Standard:

$C = 11.38 - .00538Q + 1.397[\ 2.493 - .00231Q + .00000170Q^2]$

Frequency Exceedance:

$F = 48.411 - 0.02896Q + 1.397[\ 330.1 - 0.3071Q + 0.0002254Q^2]$

Terms:

Water Year = October through September

Q = total inflow to Shark River Slough for water year, S-12s + S-333 + any additional inflow from the WCAs established in the future, thousand acre-ft/yr (Kac-ft/yr).

C = limit on maximum flow-weighted-mean inflow concentration for any Water Year, composite of all inflows to Shark Slough (ppb).

F = exceedance for maximum frequency (percent) of inflow concentrations exceeding 10 ppb, computed from the time series of concentrations composited across all inflow structures on each sampling date with positive flow in a given Water Year.

The range of flow (Q) used in deriving the limits is 117 to 1061 Kac-ft/yr. If the total flow for any water year exceeds 1061 Kac-ft/yr, a flow of 1061 Kac-ft/yr should be used in calculating the discharge limits.

Attachment II - Discharge Limits and OFW Standards for Taylor Slough and Coastal Basins

Long-Term Flow-weighted Discharge Limit & OFW Standard = 11.0 ppb

Frequency Exceedance:

Frequency of values > 10 ppb must be less than 53.1%.

Terms:

Limits are defined on a Water Year basis, October through September.

Basin flow is the total flow through structures S-332, S-175, S-18C, plus any new release points from this basin established in the future, thousand acre-ft/yr (Kac-ft/yr).

Limits apply to the flow-weighted-mean concentration for any Water Year, composite of all inflows to Taylor Slough (S-332) and Coastal Basin (S-18C).

Frequency exceedance is the exceedance for maximum frequency (percent) of inflow concentrations exceeding 10 ppb, computed from the time series of concentrations composited across all inflow structures on each sampling date with positive flow in a given Water Year.

APPENDIX B

PHOSPHORUS LEVELS AND DISCHARGE LIMITS FOR LOXAHATCHEE NATIONAL WILDLIFE REFUGE

Attachments I and II describe interim and long term total phosphorus concentration levels for the 14 Loxahatchee National Wildlife Refuge interior marsh stations. These concentration levels shall apply to monthly samples collected at 14 interior stations (CA1-3 to CA1-16) (map attached) when the average stage at the CA1-7, CA1-9, and CA1-8C gauges is greater than 15.4 feet msl (mean sea level). Phosphorus concentration levels apply to individual sampling date means. Sample date means represent geometric means, calculated from measurements at all of the 14 stations with sufficient water for accurate sampling. To account for the observed correlation between marsh total phosphorus concentration and stage, the concentration levels vary with the average interior stage on the date of sample collection. Effective dates for the phosphorus concentration levels are as follows:

	Effective Date
Interim Marsh Concentration Level (14 station geometric mean)	~~July 1, 1997~~ February 1, 1999
Marsh - Class III Standard (Applies to entire marsh)	~~July 1, 2002~~ December 31, 2006

or

Long-Term Concentration Level
(14 station geometric mean)

Interim Concentration Levels

The interim levels represent the 10% rejection level of the observed 14 station interior marsh mean concentration at a given

mean daily stage, adjusted to a baseline time period of June 1978 - to June 1979. Compliance with these concentration levels is expected to provide a long term mean 14 station interior marsh concentration of approximately 10 ppb. Interim values for the 14 station mean concentration levels can be calculated for a given mean daily stage using the equations given in Attachment I. Approximate values are as follows:

	Low Stage (15.42 ft msl)	High Stage (17.14 ft msl)
Interior Marsh Interim Concentration Levels (14 station geometric mean)	22 ppb	8 ppb

The current control program, consisting of on-line STAs and BMPs, as described in Appendices C and E, is designed to achieve a long-term average annual flow-weighted concentration of 50 ppb for each discharge to the Refuge and WCAs from the EAA. If the interim, or the lower of the long-term Refuge interior marsh station concentration levels or Class III criteria, are not met with the current control program, DER will require additional components to be added to the control program to meet a maximum annual discharge limitation of 50 ppb for all discharges into the Refuge from the EAA. The range of additional components will include increased STA acreage, more intensive management of STAs, a stronger regulatory program, or a combination of the above, based on actual performance achieved with the initial STA design and operation and the actual performance of BMPs as discussed in Appendices C and E. The State Parties shall not implement more intensive management of the STAs as the sole additional component. DER will modify the permit for

the operation of the Refuge inflow structures to include the additional components of the control program and to establish 50 ppb as a maximum annual discharge limitation which would be enforceable after the additional components are operational.

Class III Criteria

The numerical interpretation of the Class III criteria for total phosphorus for the Refuge shall be determined by a research program designed by a panel of scientists designated by the Technical Oversight Committee. The research program must be recommended by the TOC. Such research shall begin no later than July 1, 1992 and a final report shall be completed no later than ~~July 1, 1997~~ December 1, 2001. The purpose of the research will be to determine water column total phosphorus concentrations above which imbalances in populations of the natural flora and fauna within the Refuge will occur and to determine the numerical interpretation of the Class III nutrient criterion for total phosphorus. Effective ~~July 1, 2002~~ December 31, 2006, the long-term total phosphorus concentration levels for the Refuge will be the 10% rejection level of stations CA1-5, CA1-6 and CA1-16 at a given mean daily stage. These three stations had the lowest geometric mean total phosphorus concentrations during the 1978-1983 baseline period. The long term concentration levels will apply to all 14 stations. Compliance with these concentration levels is expected to provide a long term average 14 station interior marsh concentration of approximately 7 ppb. Precise values for the levels can be calculated for a given

mean daily stage using the equations given in Attachment II. Approximate values are as follows:

	Low Stage (15.42 ft msl)	High Stage (17.14 ft msl)
Interior Marsh - Long Term Concentration Levels (14 station geometric mean)	17	7

If the TOC determines Class III total phosphorus concentration levels are lower than the long term total phosphorus concentration levels then the lower levels shall apply.

~~With respect to STA-1, the original design, in operation by 1997, will include an effective treatment area of 7400 acres. The remaining acreage (4400 effective treatment area acres plus approximately 290 acres for berms, etc.) will be placed in service if the Refuge's long-term concentration levels have not been met by the July 1, 2000.~~ If the lower of the Class III or long-term levels is not met by ~~the July 1, 2002~~ December 31, 2006 and the 50 ppb maximum annual discharge limit is being met at all inflow structures into the Refuge from the EAA, the TOC will recommend a lower maximum annual discharge limit for the structures to be enforced by DER. Additional actions, such as regulatory measures and increased STA acreage, as appropriate from the empirical data on performance of each program, will be required by either DER or the District to meet the lower discharge limit.

Compliance Review

A panel of scientists designated by the TOC will track and evaluate compliance with all aspects of state water quality standards including the phosphorus limits, concentration levels and criteria

The represented agencies may request technical assistance from others. An exceedance occurs if the 14 station mean concentration is greater than the computed concentration level two or more times in any 12 consecutive sample collections. Based upon review of monthly trends for the 14 station mean and other relevant information, the TOC members will forward their opinions and recommendations to their respective agencies for relevant action. An exceedance will constitute a violation of this Agreement and relevant water quality criteria unless the TOC determines there is substantial evidence that it is due to error or extraordinary natural phenomena. If fewer than three sampling date geometric means collected within the past 12 consecutive sampling periods are below the mean interior marsh total phosphorus concentration level during the baseline period, then the panel will be convened to review monitoring data and assess the potential causes and recommend changes in the total phosphorus levels as necessary to meet the objectives of this Agreement.

Attachment I - Interim Marsh Concentration Levels for Loxahatchee National Wildlife Refuge

Interim Marsh Concentration Levels:

$C = 11.9187 - .603261S + 1.372[7.5311 - .9247S + .02882758S^2]$

Terms:

C =The natural log of the geometric mean total phosphorus concentration across 14 marsh stations (CA1-3 to CA1-16).

S =Average stage measured at gauges CA1-9, CA1-7, and CA1-8C on sampling date (feet)

This equation is applicable over a stage range of 15.42 to 17.14 feet. If the stage on any sampling date exceeds 17.14 feet, a stage of 17.14 feet should be used in calculating the concentration levels. The concentration levels should not apply to dates when the average stage is less than 15.42 feet.

Attachment II - Long Term Marsh Concentration Levels for Loxahatchee National Wildlife Refuge

Long Term Marsh Concentration Levels:

$C = 10.7172 - .541156S + 1.372[\ 7.5819 - .9310S + .02902216S^2]$

Terms:

C =The natural log of the geometric mean total phosphorus concentration across 14 marsh stations.

S =average stage measured at gauges CA1-9, CA1-7, and CA1-8C on sampling date (feet)

This equation is applicable over a stage range of 15.42 to 17.14 feet. If the stage on any sampling date exceeds 17.14 feet, a stage of 17.14 feet should be used in calculating the long term concentration levels. The equation shall not apply to dates when the average stage is less than 15.42 feet.